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**THE  
ONTARIO WATER RESOURCES  
COMMISSION**

**A  
REPORT ON**

Stream Pollution  
in the  
County of Oxford

**BY:**

K. H. Sharpe and G. Samuel

**DATE:**

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**PARLIAMENT BUILDINGS - TORONTO**

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## INTRODUCTION

This report results from a field survey of water pollution and stream sanitation in the County of Oxford. It contains information on sources of pollution and the effect of that pollution on the receiving streams.

Locations of sampling points are shown on the accompanying map of the County of Oxford. Tabulation of results are listed for ready reference.

Pollution abatement in all water courses of Ontario is a major concern of the Ontario Water Resources Commission, and provincial legislation requires that all sewage, industrial and other wastes, be so treated that they will not impair the quality of the receiving stream.

The first step in any anti-pollution program is the investigation of pollution sources. In the case of Oxford County this has been done with the results revealed in this report. The next part of the program involves the taking of measures which will correct known pollution. The Commission expects that such measures will be taken by those concerned without delay.

  
General Manager  
Ontario Water Resources Commission.

A REPORT  
on  
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## STREAM POLLUTION IN THE COUNTY OF OXFORD

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This report summarizes results of a survey carried out on Oxford County streams by the Ontario Water Resources Commission. The survey involved investigation of water pollution resulting from sanitary wastes from both urban and rural municipalities and from industrial wastes from the County's numerous industries. The middle and south branches of the Thames River which flow through the County were investigated at points in the larger municipalities.

Dr. O.C. Powers, Director of the Oxford County Health Unit, and members of his staff assisted members of the Commission staff engaged in the survey.

Special and more detailed investigations will be undertaken in the future at those points where this preliminary survey revealed the more pronounced pollution existed. Continued surveillance of the Oxford County streams will be a part of the regular program of the Commission.

### Interpretation of Analyses

For convenience in the interpretation of laboratory analyses it may be taken as an objective that pollution in streams should not exceed the following figures --

B.O.D. (Biological Oxygen Demand)	4 ppm. (parts per million)
S.S. (Suspended Solids)	15 ppm.
Coliform Counts (M.P.N. = Most Probable Number)	2400

Similarly the effluents from drains or sewage plants should have, as objectives, figures not in excess of the following--

B.O.D.	15 ppm.
S.S.	15 ppm.

### REPORTS ON MUNICIPALITIES

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#### EAST NISSOURI TOWNSHIP

##### Canada Cement Company, Thamesford

The effluent being discharged into the Jackson drain from this plant appeared to be heavy in turbidity, with the subsequent laboratory test revealing 30 ppm. of turbidity. However, the flow from the drain was quite clear at the junction of the Thames River.

Pollution problems in the area were discussed with A.J. Baker, East Nissouri Township clerk.

Uniondale Cheese Factory

It was learned that the manufacturing of cheese here has been reduced considerably. The water that is used comes from a private well. The factory owner and operator, Mr. Frazer, was interviewed.

Treatment of Wastes -- Whey from cheese manufacture is carried by tank truck to a local gravel pit for disposal. Other wastes from the factory are discharged into a concrete tank, with a tile pipe carrying these wastes to a creek which joins the north branch of the Thames River in Middlesex County. However, at the time of the inspection there did not appear to be any wastes entering the creek from the cheese factory. A septic tank with field tile disposal system is employed for sewage treatment.

Summary-- Bacteriological analyses of water samples taken from the creek would suggest that a substantial amount of pollution exists in the vicinity of the factory's drain outlet, and it is suggested that this factory drainage should not be permitted to enter the creek.

Here are the analyses:

	Coliform Counts	
	<u>Indicated No.</u>	<u>Calculated MPN</u>
Sample taken above cheese factory drain	1,000	2,400
Sample taken below cheese factory drain	10,000	24,000

WEST ZORRA TOWNSHIP

Bennington Cheese Factory

All milk received at the factory is sent to other centres. A private well supplies the factory with water, but the volume used could not be determined. In the absence of Manager Bruce McCall, one of the company directors, Ross Kittner, was interviewed.

Treatment of Wastes--When cheese is being manufactured all wastes are run to three separate concrete tanks, each 6' x 5' x 5', which in turn discharge through a drain into Bennington Creek which flows to the middle branch of the Thames River. These wastes result from cleaning operations. However, such wastes contain a quantity of milk and an unsatisfactory condition exists at the drain outfall. A septic tank and field tile disposal system is in operation for sanitary wastes.

Summary--Bacteriological analyses of the creek water and the effluent from the cheese factory drain outfall indicate a high degree of pollution as a result of the factory wastes being discharged into the creek. The samples were taken when no cheese was being manufactured so it is reasonable to assume that when the factory is in full production the pollution of the creek will increase. Wastes from this factory should not be allowed to enter the creek at any time.

Here are the analyses:

	Coliform Counts		
	<u>Indicated No.</u>	<u>Calculated</u>	<u>MPN</u>
Bennington Creek above factory drain	100,000	240,000	
Bennington Creek below factory drain	10,000,000	24,000,000	
	Solids (ppm.)		
	<u>B.O.D. (ppm.)</u>	<u>Total</u>	<u>Supp.</u>
Factory drain effluent	420	1,188	744

## Embro

A storm drain runs through the village and discharges into the middle branch of the Thames River. Mr. J. Griffith, sanitary inspector with the Oxford County Health Unit who had carried out surveys in the village some time ago, expressed the opinion that some domestic wastes entered the village storm drain through connections from private homes. Samples of water were taken from the stream for bacteriological analyses as well as a sample of the effluent from the village drain for sanitary chemical analysis. The investigation here also included an interview with Mr. Ross Smith, Embro village clerk.

Summary---Both bacteriological and sanitary chemical results were satisfactory at the time of the survey. However, local health authorities report that pollution has existed in the storm drain on other occasions. This would suggest continual close checking would be desirable.

Here are the analyses:

### Middle Branch, Thames River

	Coliform Counts	
	<u>Indicated No.</u>	<u>Calculated MPN</u>
One mile north of Embro, above village drain	10,000	24,000
25 yards below village drain	1,000	2,400
Solids (ppm.)		
	<u>Total</u>	<u>Susp.</u> <u>Diss.</u>
Effluent from village drain	1.1      455	10      448

### Red Star Cheese Factory

This factory is owned by the Borden Company. Mr. H. Stockman, the manager, was interviewed. Manufacturing of cheese has been discontinued and all milk received is sent to other centres. Mr. Stockman reported the factory used about 2,000 gallons of water daily.

Disposal of Wastes---Industrial wastes enter the Thames River through a drain, while sewage from the factory is discharged directly into the river. This latter was determined by means of a dye test carried out by Mr. J. Griffith of the Oxford County Health Unit. Fluoresceine dye was placed in the factory toilet and then flushed. The dye showed in the river immediately. Raw sewage also was visible.

Summary---Results of analyses of samples taken from the river in the vicinity of the factory would lead to the conclusion that raw sewage and industrial wastes are permitted to enter the river. Immediate steps should be taken to deal with this situation.

Here are the analyses:

	Coliform Counts	
	<u>Indicated No.</u>	<u>Calculated MPN</u>
No. 13 Red Star Cheese Factory		
50 yards above factory drain	1,000	2,400
No. 14 Red Star Cheese Factory		
20 yards below factory drain	1,000	2,400

*Canada Cement*

EAST ZORRA TOWNSHIP - TAVISTOCK

Tavistock

Mr. J. Griffith of the Oxford County Health Unit advised that there were a number of private homes connected to the village storm drains which, in turn, discharge into a creek which joins the south branch of the Thames River. Further, two local industries, the Tavistock Cheese and Butter Company and the J.G. Field and Company, knitting mill, discharge wastes.

Tavistock Cheese and Butter Company

At the time of the inspection cheese was not being manufactured and milk received was being shipped to other centres. The factory's water supply was obtained from a well, but the volume used could not be determined.

Disposal of Wastes-- Manager R. Kaufman of the factory advised that wastes from the plant entered a catch basin and discharged through a drain into an open ditch 150 yards northeast of the factory. This ditch flows to a creek which joins the south branch of the Thames River. A septic tank and field tile disposal system is employed for sewage disposal.

Summary--Analyses of effluent from the factory drain and of water from the creek indicated heavy pollution, forcing the conclusion that waste from the plant should not be permitted to discharge into the creek. In fact, the condition of the creek should receive immediate attention.

Here are the analyses:

Chemical analysis of effluent from factory drain--

<u>5-day B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
297	656	146	510

Bacteriological analysis of creek water--

	<u>Coliform Counts</u>	
	<u>Indicated No.</u>	<u>Calculated MPN</u>
No. 8 - At bridge 1 1/2 miles south of Tavistock, 13th Concession, East Zorra Township	1,000,000	2,400,000
No. 9 - At bridge 1/2 - mile south of Tavistock, 13th Concession, East Zorra Township	100,000	240,000

J.G. Field and Company, Limited

Mr. T. Mallon, plant foreman, was interviewed in the absence of Mr. S.D. McDougall, manager. Plain woollen socks were being manufactured, with no dyeing involved. A considerable amount of water was being used for washing and rinsing--approximately 4,000 gallons a day.



Disposal of Wastes--Waste from the plant is discharged into a two-compartment concrete tank 24' x 12' x 6'. The compartments are cleaned out at regular intervals and the solids disposed of on the property. Examination of a sample of the effluent, taken at the plant catch basin before it enters the Tavistock storm sewer, revealed that treatment of the wastes from the knitting mill was inadequate.

The analysis--

<u>B.O.D. (ppm)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
760	2,230	736	1,494

#### Tavistock Storm Sewer

The Tavistock storm sewer which takes the storm water from the north-east side of the municipality discharges into an open ditch, one mile south-east of the village near the railway tracks. The ditch flows through the property of Mr. R. A. Ramsayer into the Thames River. A water sample was taken from the ditch near the Ramsayer farm, and examination revealed some pollution existed in this ditch--

<u>5-day B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
16	352	20	332

A sample taken from the main storm sewer in Tavistock indicated upon examination that waste was in the storm water flow--

<u>5-day B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
67	582	252	330

In an overall summary, it can be stated that sanitary and industrial pollution reaches the south branch of the Thames River from two creeks in the Tavistock area. One creek carries the wastes from the cheese factory sewer which also receives the waste from the J.G. Field knitting mill.

Dredging operations were underway on the Thames River immediately south of Tavistock, thus making sampling impractical.

#### Hickson

There are two storm drains on the west side of Hickson, and wastes from private homes and a slaughter house are permitted to enter these drains. The storm drains discharge into a small creek which flows to the south branch of the Thames River. The Borden Cheese Factory also discharges wastes into the same creek.

#### Slaughter House--Operation and Disposal of Wastes

In the absence of the owner of the slaughter house, a Mr. Rudy of Hickson, (his son was interviewed) It was learned that animals are slaughtered on the premises, and that while blood and offal wastes are taken to the Stone Fertilizer Company other wastes are discharged into the storm drain.

Summary-- Connection between the slaughter house and the storm drain should not be permitted. However, it was learned that following the O.W.R.C. official's visit Mr. Rudy got in touch with the Oxford County Health Unit and indicated he is desirous of carrying out the requirements of the local public health authorities in regard to the disposal of wastes.

### Borden Cheese Factory

Mr. H. Fullick, plant manager, reported that the manufacturing of cheese had been discontinued, and that all milk received at the plant was being sent to other centres.

Disposal of Wastes-- All wastes are discharged through a drain to a creek 150 yards north of the plant, the wastes resulting from cleaning operations. Bacteriological analysis of water taken from the creek revealed--

		Coliform Counts	
		<u>Indicated No.</u>	<u>Calculated MPN</u>
No. 10	50 yards above Borden plant drain	10,000	24,000
No. 11	30 yards below Borden plant drain	1,000,000	2,400,000

Sanitary chemical analysis of the effluent taken from the Borden plant outfall at the creek revealed--

<u>B.O.D. (ppm.)</u>	Solids (ppm.)		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
64	624	44	580

Summary--These results indicate a high degree of pollution, the only conclusion being that factory wastes should not be allowed to enter the creek.

### Summary on Hickson

Three sources of pollution are apparent in Hickson--

- 1- Domestic wastes from private homes entering the storm drains.
- 2- Wastes from the slaughter house entering the storm drain.
- 3- Wastes from the Borden Cheese Factory discharging into the creek.

A sanitary chemical analysis of the effluent from the storm drains revealed--

<u>B.O.D. (ppm.)</u>	Solids (ppm.)		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
56	582	252	330

These results indicate that sewage wastes are present in the storm water flow, and that private homes and industries should not be permitted to discharge wastes into storm drains or creeks.

### Innerkip

Innerkip does not appear to have pollution problems. The municipal storm drain discharges into a marsh, while wastes from the Curtis chicken killing plant are hauled away for burial on local farms. Other chicken plant wastes discharge into a septic tank and field tile system.

It should be noted that two tributaries of the middle branch of the Thames River join some three miles northwest of Innerkip which is in East Zorra Township, one flowing from Tavistock and the other from Hickson. The middle branch of the Thames flows into Woodstock.

### Cassel

Horner's Creek enters Oxford County three miles east of Tavistock and flows through Cassel where, investigation revealed, the Cassel Cheese and Butter Company appears to be the only known source of pollution in the area.

#### Cassel Cheese and Butter Company, R.R. #1, Tavistock

Mr. Walter Kaufman, plant manager, reviewed the method of waste disposal at the plant where milk is received for the manufacture of cheese.

Disposal of wastes-- A septic tank and field tile disposal system is used for disposal of sewage from the plant. The whey is taken to local farms to be used as pig feed. Other industrial wastes discharge through a two-compartment septic tank (approximately 14' x 8' x 6') into a drain, which in turn discharges into Horner's Creek, about three-quarters of a mile southeast of the cheese factory.

Sanitary chemical analysis of the effluent revealed--

<u>B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
26	1,034	32	1,002

Bacteriological results from samples taken from Horner's Creek in the vicinity of the Cassel cheese factory follow--

		<u>Coliform Counts</u>	
		<u>Indicated No.</u>	<u>Calculated MPN</u>
No. 17	At Creek, two miles south of Cassel, approximately 100 yards below factory outlet	100	240
No. 18	At Creek, 200 yards above factory outlet	100,000	240,000

Summary--A heavy degree of pollution is indicated by the results of the B.O.D. test, revealing that the cheese factory wastes should not be permitted to enter the creek.

German Union Cheese Factory, R.R. #1, Tavistock

A tributary which originates in the 17th Concession of East Zorra Township joins Horner's Creek approximately three miles southwest of Cassel. Wastes from the German Union Cheese Factory, owned by Mr. C. Stockman, and located four miles east of Tavistock, are discharged into the creek.

Operation and Disposal of Wastes--Cheese is manufactured at the plant. Sewage disposal is by means of a septic tank and field tile system, while whey is taken by tank truck for final disposal in a gravel pit. Other industrial wastes are discharged through a drain into the creek which is a tributary of Horner's Creek.

Sanitary chemical analysis of the effluent at the cheese factory outlet revealed--

<u>B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
2,280	1,352	402	950

Bacteriological analyses of water samples taken from the creek revealed--

		<u>Coliform Counts</u>	
		<u>Indicated No.</u>	<u>Calculated MPN</u>
No. 14	20 yards above factory drain	1,000	2,400
No. 15	20 yards below factory drain	10,000,000	24,000,000

Summary--Results of examination of samples taken in the vicinity of the German Union Cheese Factory drain outlet indicate serious pollution of the creek as a direct result of discharge of untreated cheese factory wastes. As soon as possible steps should be taken to remedy this condition.

BLANDFORD TOWNSHIP

Bright

Horner's Creek flows within one mile of the village of Bright in Blandford Township. The only source of pollution in that area appeared to be the Bright Cheese and Butter Company.

Bright Cheese and Butter Company

The plant manager, Mr. M. Smith, advised that cheese was processed at the plant.

Disposal of Wastes--Sewage disposal is through a septic tank and field tile system, while industrial wastes are discharged into a five-compartment settling tank. A drain leads from the tank to a ditch, one-half mile southwest of the cheese factory, and the ditch flows into Horner's Creek.

Sanitary chemical analysis of effluent taken at the factory drain outfall revealed--

<u>B.O.D. (ppm)</u>	<u>Solids</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
76	572	22	550

Bacteriological analyses of water samples taken at Horner's Creek revealed--

		<u>Coliform Counts</u>	
		<u>Indicated No.</u>	<u>Calculated MPN</u>
No. 19	Two miles southwest of cheese factory--at point of entry of ditch into Horner's Creek.	1,000,000	2,400,000
No. 20	Horner's Creek, one mile west of Bright at bridge on Highway 27 (above factory ditch)	1,000	2,400

Summary--Laboratory tests revealed that the Bright Cheese and Butter Company factory was a source of pollution and that steps should be taken to prevent the discharge of wastes from the factory into Horner's Creek.

#### BLLENHEIM TOWNSHIP

Examination of samples taken from the Nith River indicated the greatest incidence of pollution was in the Plattsville area.

#### Plattsville

This community has no public water supply, and septic tanks are used for sewage disposal. The only industry discharging wastes into the Nith River was the Canada Sand Paper Company.

#### Canada Sand Paper Company

The plant manufactures sand paper, and the plant manager, Mr. S. Green, supplied other necessary information.

Disposal of Wastes--A septic tank and field tile system is used for sewage disposal. Water used for cooling is discharged into a ditch which flows into the river. The amount of water used could not be determined, but a sanitary chemical analysis of a sample of the effluent in the factory ditch revealed--

<u>B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
2.4	602	250	362

This result would indicate that primary treatment was necessary for the removal of solids.

Bacteriological analyses of water samples taken from the Nith River revealed--

		Coliform Counts	
		<u>Indicated No.</u>	<u>Calculated MPN</u>
No. 21	East Branch, one-quarter mile north of Plattsville	1,000	2,400
<i>eliminate spec</i>	No. 22		
	Below Canada Sand Paper Company drain outlet	100,000	240,000

Summary--These results are indicative of the pollution contributed by the drain of the Canada Sand Paper Company. However, the firm is building a new plant east of the present one, and plans for the installation of a large septic tank and field tile disposal bed have been approved by the Oxford County Health Unit.

*(2400 MPN Coliform Count)*

Satisfactory results were obtained from bacteriological analyses of samples of water taken from the west branch of the Nith River--

		Coliform Counts	
		<u>Indicated No.</u>	<u>Calculated MPN</u>
No. 24	One and one-half miles west of Plattsville	1,000	2,400
No. 25	200 yards before joining with east branch	1,000	2,400

#### Washington

The Nith River is joined by a creek which passes close to Washington. Bacteriological analyses of water samples taken from the creek revealed--

		Coliform Counts	
		<u>Indicated No.</u>	<u>Calculated MPN</u>
No. 27	West entrance to municipality	1,000	2,400
No. 28	300 yards south of municipality	10,000	24,000

The marked increase in Sample No. 28 over Sample No. 27 would suggest that pollution was entering the creek from private homes in the area. It is suggested no homes should be allowed to discharge wastes into the Creek.

*Drumbo & Preston*

#### NORWICH NORTH AND DEREHAM TOWNSHIPS

Investigation revealed that two industries south of Woodstock were directly responsible for pollution of a stream known as Sweaborg Creek which flows into the Thames River at Woodstock. The industries concerned were Donland's Dairy, Oxford, Limited, R.R. #1, Burgessville, Dereham Township, and York Farms Limited, Pea Vining Station, 1st Concession, Norwich North Township.



Donlands Dairy, Oxford, Limited

Plant Manager F. Gillies was interviewed, and it was learned that manufacturing of cheese had been discontinued and that milk received at the plant was being shipped to other centres.

Disposal of Wastes--A septic tank and field tile system was employed for sewage disposal, while floor drainage was discharged into a three-compartment concrete tank. Two concrete catch basins were provided to receive drainage from an elevated whey tank, but this was not in use at the time of the O.W.R.C. official's visit because no cheese was being manufactured. Effluent from the three-compartment tank was discharged through a drain into a creek three miles north of the factory.

Sanitary chemical analyses of effluent in this drain revealed--

	<u>B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
		<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
Effluent from drain at dairy	1,480	2,018	1,408	610
Effluent from drain three miles north of dairy	22	330	40	280

Summary--These results indicated that the effluent from the cheese factory drain contained heavy pollution, and that steps should be taken to prevent wastes from being discharged into Sweaborg Creek.

York Farms Pea Vining Station, Norwich North Township

At the time of the O.W.R.C. official's visit, operations had been concluded for the season. However, wastes from the pea vining operations gave off a strong, obnoxious odor, and liquid from the pea stack drained into a ditch. The ditch led to a field tile which joined Sweaborg Creek about two miles northwest of the pea vining station.

Sanitary chemical analyses of effluent revealed--

	<u>B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
		<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
Effluent from pea vining station, at ditch	14,800	16,132	5,116	11,016
Effluent from pea vining station, two miles northwest of station	13	424	48	376

Summary--The laboratory results indicate that drainage from the station should not be permitted to enter any stream. It was learned that Mr. I. Charlten of the Oxford County Health Unit had investigated the station following complaints from area residents. Mr. Charlten advised the manager at the company's office in Brantford that the method of waste disposal was unsatisfactory. In reply the company said that some consideration was being given to the use of a spray irrigation system.

WOODSTOCK

Investigation of the Thames River in the vicinity of Woodstock, Beachville and Ingersoll was carried out, in part, by Commission investigators during previous stream surveys. The results of this sampling, included here, indicate pollution in the river at all three places.

<u>Sampling Points</u>	<u>Lab. No.</u>	<u>MPN B. Coli</u>
23. South Thames River at Beachville	241	10,000
24. Ingersoll sewage disposal plant, raw	242	120,000,000
25. " " " " effluent	243	350,000
26. South Thames below Ingersoll	244	21,000
27. South Thames River at Putnos above middle Thames outfall	245	24,000

Results of B.O.D. analyses of samples taken at the Woodstock and Ingersoll sewage treatment plants were satisfactory.

	<u>5-day B.O.D.</u>	<u>Total</u>	<u>Solids Susp.</u>	<u>Diss.</u>
Ingersoll plant - raw	762	1,564	434	1,130
" " -effluent	4.8	708	32	676
Woodstock plant - raw	96	652	150	502
" " -effluent	6.4	646	236	410

The Woodstock sewage treatment plant was enlarged recently and as a result the amount of pollution in the river at the plant outfall was greatly reduced. However, a project which would pump sewage from the southwest section of the city to the main sewage treatment works had not been completed at the time of this investigation with the result that some raw sewage effluent was being discharged into the river. That particular section of the city was formerly served by a septic tank unit which was abandoned.

*insert*  
Summary--The Thames River is under regular stream survey by members of the Commission's Industrial Wastes Division, but it will be necessary to do a more detailed survey of storm sewer outlets in the future to ensure that no industrial or sanitary wastes are being discharged through these outlets in the Thames River.

INGERSOLL

Existing conditions in the Thames River, relative to pollution, were discussed with Mr. R.E. Winlaw, town clerk, and Mr. D. Seath, manager of the Public Utilities Commission.

Ingersoll has a modern sewage treatment plant and samples taken at the time of the visit indicated satisfactory treatment. However, it was drawn to the attention of the Commission that a number of residences on sewered streets were not connected to the system and were employing private septic tanks and field tile disposal systems. This is not a satisfactory arrangement in a built-up area, and it is suggested that municipal officials renew efforts to have all homes on sewered streets connected to the sanitary sewers.



Industrial Waste Disposal--Several waste-disposal investigations of the town's industries were made in previous years. These reports are available and will be re-investigated as soon as possible by the Commission's Industrial Wastes Division, at which time recommendations in this connection will be brought up to date.

Industries listed below discharge wastes into the Thames River thus causing an unsatisfactory pollution condition. Further, these industries have not yet adopted recommended treatment procedures.

A summary of recommendations made several years ago to the various industries concerned follows--

Borden Company, Ltd.--It was recommended that the effluent from the evaporators not be taken into the municipal sewers at the time, but that an effort be made to lower the B.O.D. of this waste.

Ingersoll Cheese Company, Ltd.--It was recommended that the margarine department waste should be put in the municipal sanitary sewer. Arrangements, it was stated, could be made, with maintenance by the company, for efficient grease removal treatment.

Ingersoll Machine and Tool Company--It was recommended that soluble oil should not be dumped into the sewer but should be stored and treated chemically to break the emulsion, then settled to break the solids. The oil should be separated before being discharged into the sewer. It was also recommended that a further check should be made on the cyanide content of the waste over a period when processes producing such wastes were in progress.

W.M. Stone and Sons, Ltd.--It was recommended that waste should receive further treatment for removal of B.O.D. suspended solids and grease. It also was recommended that sanitary sewage from the septic tanks should be put into tile beds or should receive secondary treatment along with industrial wastes.

Morrow Screw and Nut Company--In regard to Plant #1 it was recommended that all oil waste should be kept out of the sewer. It was suggested that different housekeeping methods might eliminate most of it. Another recommendation was that cyanide wastes should be collected and treated before discharge. As for Plant #4 it was recommended that all wastes should be neutralized and settled to remove solids before discharge into the river. It was suggested that as an alternative the wastes could be lagooned after neutralization.

#### Summary

Pollution in the Thames River in the vicinity of Ingersoll is largely due to industrial wastes being discharged untreated or only partially treated. Industries have not met their obligations in the matter of treatment of wastes.

A number of complaints in this connection have been received by the Commission. One in particular concerns a creek which receives wastes from the Borden company and the Ingersoll Machine and Tool Company. The creek enters the Thames River. In addition, the number of residences in the town

on sewerred streets which are not connected to the sewers is high considering the length of time the system has been in operation. Municipal officials should renew their efforts to remedy this situation.

### OTTER CREEK

Main contributions to pollution of Otter Creek, the source of which is near Holbrook in Norwich North Township come from Norwich, Otterville and Tillsonburg.

#### Norwich

Mr. A. L. Bushell, clerk and treasurer of Norwich, supplied information regarding storm sewer locations in the village. It was learned that several homes in the village had been ordered by the Oxford County Health Unit to discontinue discharging domestic wastes into the storm sewers. Two industries were discharging trade wastes into Otter Creek.

#### West, Taylor, Bickle Company

Mr. H. A. Hodges, plant manager of the firm which manufactures brooms, was interviewed.

Disposal of Wastes--A septic tank and field tile disposal unit is used for sewage disposal, with one of the laterals discharging effluent from the septic tank into the creek. Public Utilities Commissioner Bushell was authority for the information that the factory consumes approximately 50,000 gallons of water per month.

Industrial wastes from the plant consist of water and dye. The dye is discharged into a copper-lined settling tank (approximately 8' x 2' x 2') and some solids are removed manually. The effluent from the tank flows through a drain into Otter Creek.

Water samples for bacteriological analyses, taken from the creek in the vicinity of the plant, revealed--

	<u>Ind. Nos.</u>	<u>Calculated MPN</u>
No. 2 At bridge on Main St., above broom factory	1,000	2,400
No. 3 Below broom factory outfall	100,000	240,000

These results indicated pollution in the area of the factory drain outfall.

A sample taken from Otter Creek in the same area and submitted for sanitary chemical analysis revealed--

<u>B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
1	432	6	426

Summary--The field tile lateral leading from the factory's septic tank should not be permitted to discharge into the creek--in fact, no industrial wastes should be discharged untreated into the creek.

Canada Vinegars Limited

At the time of the first inspection the plant was not in operation, but the method of waste disposal was reviewed with Manager M. Meredith. However, a later visit was arranged when the plant was in operation and Mr. J. Johnson was interviewed in the absence of the manager. The plant operates from September to November, the volume of water used being estimated at 6,000,000 gallons a month.

Disposal of Wastes--A septic tank and field tile disposal system was employed for sewage disposal. Cooling water is separated from plant wastes and is discharged directly into Otter Creek. A concrete settling tank (18' x 4' x 5') was installed recently. It was observed that the inlet and outlet were located about five inches from the bottom of the tank, giving little space for the settling of wastes. A drain from the tank discharged into Otter Creek. A sample of effluent from the plant was submitted for a sanitary chemical laboratory analysis with the following result--

<u>B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
4,560	6,650	80	6,570

It was learned the company was contemplating purchase of one and one-half acres of land near the plant for spray irrigation purposes.

Summary--This plant should be advised to employ the spray irrigation system before the beginning of its 1958 season. It was noted from previous reports that the firm also contemplated such a system in September, 1956.

Further sampling of Otter Creek at Norwich was carried out and results of laboratory tests are included in the table of "Analyses and their Interpretations" at the end of this report. A sanitary chemical analysis of a sample taken from the main municipal storm sewer at the outfall at Stover Street bridge revealed--

<u>B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
12	660	36	624

These results indicate that sewage wastes were being discharged into the storm sewer.

Otterville

This Police Village has one storm drain which flows into Otter Creek near the dam. Samples were taken from the creek throughout Otterville and the bacteriological results will be found at the end of this report. A sanitary chemical analysis of a sample taken near the dam revealed--

<u>B.O.D. (ppm)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
1.9	760	408	352

### Tip Top Cannery

Mr. E. R. Roberts, canning factory manager, was source of the information that the plant operated from June to November, and that water was obtained from the municipal supply, a private well and the river. At the time of the investigation corn and pumpkin were being processed.

Disposal of Wastes--The system of wastes' disposal was found to be satisfactory, the plant having adopted a lagoon system in which wastes are directed to a concrete tank and then pumped to two lagoons, both of which were operating satisfactorily at the time of the investigation. No discharge to the creek was visible.

### Otterville Summary

It would appear that the main source of pollution in Otterville came from private homes discharging domestic wastes into the creek.

### Tillsonburg

Mr. Burt Neal, town clerk, was interviewed, and Mr. J. Hornsby, town works superintendent, advised that sanitary sewers in the town were directed to a municipal settling tank, while storm sewers discharged directly into Otter Creek. Industrial wastes from the Co-Operative Dairies, Keewadin Dairy and the Borden plant were discharged directly into the creek.

### Co-Operative Dairies

This plant <sup>part. milk</sup> (manufactures cheese) with its water supply obtained from six drilled wells. The volume could not be determined. Mr. W. Jeffercy, plant superintendent, was interviewed.

Disposal of Wastes--All wastes are discharged into a catch basin on the north side of Concession Street, about 80 yards south of the plant. Incidentally, the Keewadin Dairy also discharges wastes into this catch basin. A drain leads from the basin to the south end of Concession Street and discharges into a ditch near the C.P.R. bridge. The wastes enter Otter Creek in this area. Six catch basins are located on Concession Street about 300 feet apart. These basins serve as clean-outs in the event of drain blockage.

Two samples of effluent were taken for sanitary chemical analysis and both indicated heavy degree of pollution--

		Solids (ppn.)		
		<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
<u>B.O.D. (ppm.)</u>				
September 18, 1957	13,360	11,740	2,054	9,686
October 1, 1957	4,980	5,787	210	5,577

Summary--As noted previously there was a heavy degree of pollution in the catch basin which also received wastes from the Keewadin Dairy. It was not possible to take separate samples of either the cheese factory or dairy wastes.

When the Town of Tillsonburg provides a new sewage treatment plant, it is suggested that the cheese factory should make arrangements for primary treatment of its wastes before discharging them into the municipal sewer system.

#### Keewadin Dairy

Mr. M. Seymour, owner and manager of the plant which pasteurizes and bottles milk, was interviewed. Water used was 2,000 gallons a day.

Disposal of Wastes--A septic tank and field tile disposal system was in operation at the time of the investigation, and industrial wastes, as previously noted, discharged into the Concession Street catch basin. These wastes, together with the cheese factory wastes, were then discharged into Otter Creek.

A sample of effluent from the dairy taken at a catch basin on the dairy property, after sanitary chemical analysis, revealed--

<u>B.O.D. (ppm)</u>	<u>Solids (ppm)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
552	880	220	660

Summary--The result of this laboratory analysis indicated heavy pollution, suggesting that such wastes should not be permitted to be discharged untreated into the creek.

#### Borden Dairy

Mr. Roy Knott, superintendent of the plant which manufactures evaporated milk, was interviewed.

Disposal of Wastes-- Water Volume used for cooling purposes could not be determined because it was obtained from both a pond and a stream. Wastes, resulting mainly from cleaning operations, were discharged into Otter Creek. A sample of water taken from Otter Creek, where the wastes are discharged, was sent to the laboratory for analysis. The result--

<u>B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
6.8	430	90	340

Summary--This result shows some contamination. A procedure should be in use to ensure that no adverse pollution reaches Otter Creek.

#### Tillsonburg Summary

Samples were taken from Otter Creek throughout Tillsonburg and all results of bacteriological tests will be found at the end of this report. A sample of the effluent from the municipal settling tank was taken for sanitary chemical analysis with the following result--

<u>B.O.D. (ppm.)</u>	<u>Solids (ppm.)</u>		
	<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
202	592	122	470



Industries mentioned together with private dwellings in Tillsonburg are discharging wastes directly into Otter Creek. There is great need for a sewage treatment plant in the municipality.

#### Spider Creek

Source of Spider Creek is in Dereham Township and it enters Otter Creek three-quarters of a mile south of Otterville in Norwich North Township. There are two industries near Spider Creek--the Dereham Centre and Newark cheese factories.

#### Dereham Centre Cheese Factory, Rn 1 Mt Elgin

The manufacturing of cheese had been discontinued, with milk received at the factory being shipped to Co-Operative Dairies at Tillsonburg, owner of the Dereham factory.

Disposal of Wastes--Wastes resulting from cleaning operations are discharged into a septic tank and into Spider Creek. During this particular investigation there were no wastes entering the creek from the cheese factory. No sampling was carried out due to flooding conditions.

Summary--It is suggested that a satisfactory waste disposal system for this factory, provided no cheese is manufactured, would be a field tile system. There is adequate space behind the factory to install such a system.

#### Newark Cheese Factory, Norwich North Township

The manufacture of cheese was not being carried out at the time of the investigation. Owner Lloyd Peat was interviewed.

Disposal of Wastes--Wastes from the plant are discharged into a septic tank and field tile disposal system. When cheese is being manufactured the whey is separated from other wastes and is disposed of by spraying on the road.

Summary--There did not appear to be any pollution entering Spider Creek from this source during the investigator's visit.

#### REYNOLD'S CREEK

Domestic wastes from Mount Elgin and Verschoyle were being discharged into the creek.

#### Mount Elgin Cheese Factory

Manufacturing of cheese had been continued and milk received at the plant was shipped to other centres, it was learned from Manager R. Harvey. Wastes from cleaning operations were discharged into a septic tank and into the Mount Elgin storm sewer. When cheese was manufactured at the plant the whey was collected by local farmers.

Summary--The cheese factory wastes should not enter the storm sewer. Sampling of Reynold's Creek was carried out in the vicinity of Mount Elgin and bacteriological results will be found at the end of this report.

A sample of the effluent being discharged into the creek from the storm sewer revealed after sanitary chemical analysis--

<u>B.O.D. (ppm)</u>	<u>Total</u>	<u>Solids</u>	
		<u>Susp.</u>	<u>Diss.</u>
0.7	474	14	460

This result shows some contamination. A procedure should be in use to ensure that no adverse pollution reaches Reynold's Creek. Sewage and industrial wastes should not be discharged untreated into the Mount Elgin storm sewer.

#### Verschoyle, Dereham Township

It is believed that a number of buildings are connected to a storm drain in the area which discharges into Reynold's Creek. The school was said to be connected to the drain, but it was noted that at the time of the investigation a new field tile disposal bed was being installed.

#### Verschoyle Cheese Factory

The plant superintendent, Mr. H.D. Allyson, was interviewed. The plant received milk which was sent to other centres since no cheese was being manufactured.

Disposal of Wastes--Wastes from the plant were discharged into a septic tank, with the effluent from the tank going into the storm drain which emptied into Reynold's Creek.

Summary--No industrial wastes should be discharged into the storm drain, and the cheese factory should have a ~~waste~~ disposal system.

It was impossible at the time of the investigation to take a sample from the storm drain for chemical analysis since there was no flow.

#### Brownsville, Dereham Township

The Oxford County Health Unit reported some pollution in Brownsville, since some domestic wastes were being discharged from private homes into a storm drain which in turn discharges into a creek which flows into Elgin County. No samples were taken at Brownsville because of flooding conditions.

STREAM POLLUTION IN THE COUNTY OF OXFORD

--Summary of Report--  
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Laboratory examination of water samples taken in the northern section of the County do not indicate heavy pollution, but it was learned during the investigation that some municipalities, particularly Embro, Hickson and Tavistock, were discharging domestic wastes into the streams through storm sewers.

Cheese factories were found to be serious offenders, it being found that wastes from these plants were being discharged directly or with only partial treatment into the streams. One other industry in the northern section, the J. G. Field Company, operator of a knitting mill in Tavistock, was not providing adequate treatment for the plant's industrial wastes.

Pollution was revealed in the vicinity of Woodstock, Beachville and Ingersoll in the south branch of the Thames River. In the Woodstock section pollution was caused by lack of complete treatment. This pollution was apparent in the river as far as Beachville.

The section of the river at Ingersoll was revealed to be polluted from industrial wastes from the town's various industries. Also, there was some sanitary contamination due to an unsewered area and to the number of buildings and homes using private sewage facilities.

The middle branch of the Thames proved to be relatively free of pollution. There was some pollution southwest of Embro where the Red Star Cheese Factory discharges its wastes into the stream. There also was found to be some contamination in the area of the Police Village of Thamesford.

Sweaborg Creek which flows into the Thames at Woodstock receives waste discharge from the Donland's Dairy (Oxford) Limited plant and from the York Farms Limited pea vining station in the Holbrook district. There was indication that heavy pollution exists at both points.

Otter Creek receives heavy pollution at Norwich from plants of Canada Vinegars Limited and the West Taylor Bickle Company. Further, sanitary wastes are discharged from municipal sewer outlets. At Otterville, the creek reveals low contamination with the exception of one point three-quarters of a mile south of the village.

At Tillsonburg, Otter Creek is heavily polluted from sewer outlets carrying industrial and sanitary wastes. However, municipal action in adopting corrective steps is expected in the near future since Tillsonburg officials have under consideration a sewage works report by R. V. Anderson and Associates, Toronto engineering firm.

Recommendations

As a result of this survey, it is recommended that--

1- the eight cheese factories and the J. G. Field Company knitting mill in the County's northern section provide adequate treatment of all wastes



before they are discharged into the streams;

2- the Canada Sand Paper Company in Plattsville provide satisfactory treatment for its sanitary wastes;

3- the Woodstock sewage works be completed to provide complete treatment of all wastes before they are discharged into the Thames River;

4- Ingersoll industries provide treatment of industrial wastes, as recommended, before their discharge into the Thames;

5- Norwich industries provide satisfactory treatment of the wastes before discharge into Otter Creek;

6- proper sewage treatment facilities be provided by the Village of Norwich;

7- the town of Tillsonburg provide sewage treatment and that these facilities include provision for treatment of industrial wastes. If these cannot be treated by municipal facilities separate facilities should be required for each industry;

8- where it is not feasible for smaller municipalities to provide sewage works, a survey be made by Oxford County Health Unit officials to ensure that individual sewage treatment units serving private residences are satisfactory and are not discharging raw or partially treated sanitary wastes to storm sewers, drains, ditches or water courses.

#### Commission Policy Outlined

Gwyn Samuel of the Ontario Water Resources Commission, who conducted the survey, outlined the Commission policy on stream investigations and corrective measures to a meeting of Oxford County Council on September 19th, last, in Woodstock. Section 27 of the Ontario Water Resources Commission Act, 1957, was reviewed, it being pointed out that the legislation is specific in respect to the prevention of water pollution.

#### Analyses and their Interpretation

Following is a report on bacteriological analyses of the numerous water samples taken during the survey--

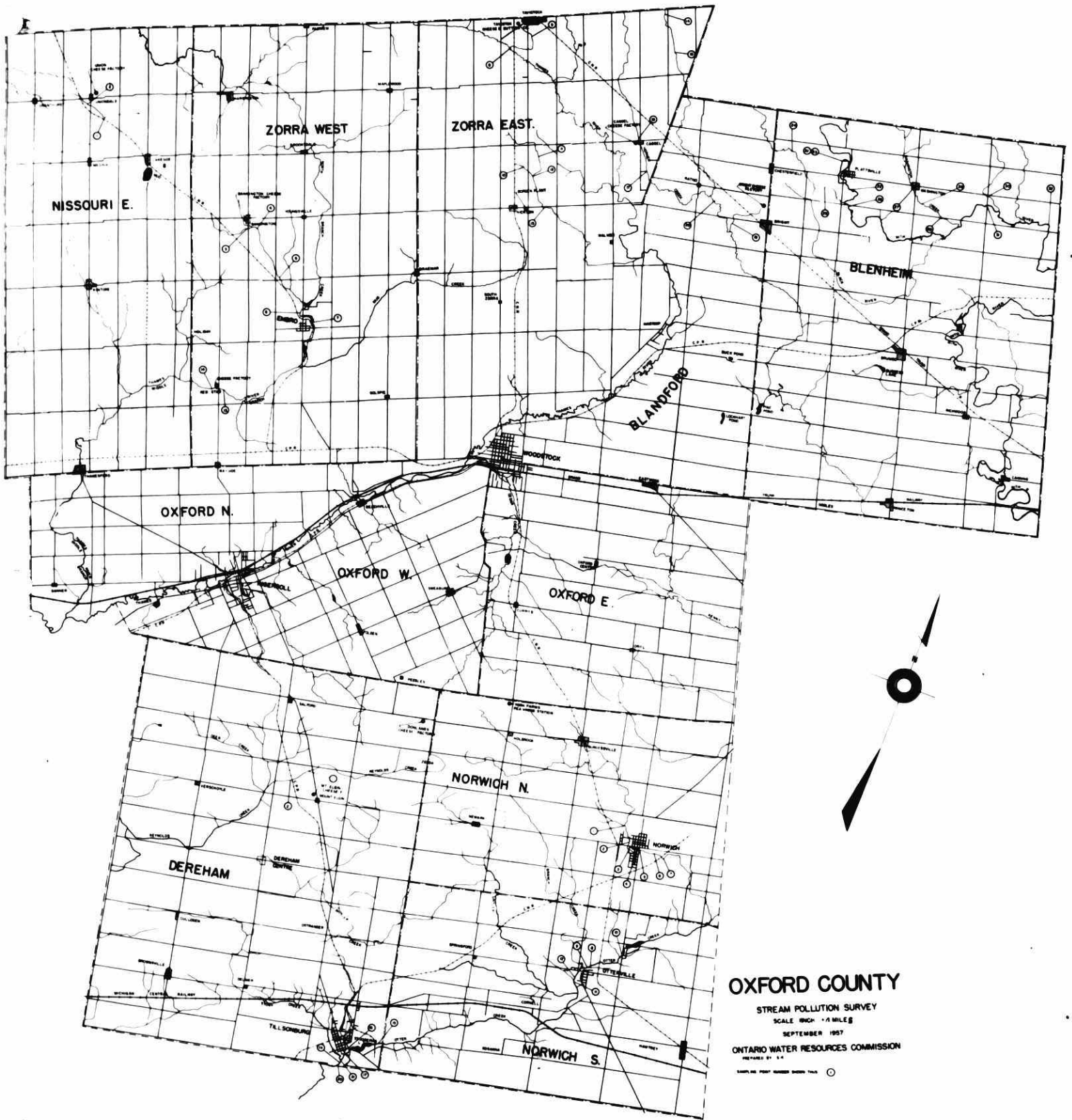
(For convenience in interpretation of the analyses it may be taken as an objective that pollution in streams should not exceed the calculated M.P.N. of 2,400 organisms per 100cc.)

<u>Sample Number</u>	<u>Place</u>	<u>Indicated No.</u>	<u>Calculated MPN</u>
1-	Uniondale Creek above cheese factory drain	1,000	2,400
2-	Uniondale Creek below cheese factory drain	10,000	24,000
3-	Bennington Creek above cheese factory drain	100,000	240,000

<u>Sample Number</u>	<u>Place</u>	<u>Indicated No.</u>	<u>Calculated MPN</u>
4-	Bennington Creek below cheese factory drain	10,000,000	24,000,000
5-	Bennington Creek 1 mile S.E. of Bennington Cheese factory	10,000	24,000
6-	Bennington Creek 1 mile N. of Embro, above village drain	10,000	24,000
7-	Bennington Creek, 25 yards below Embro Village drain	1,000	2,400
8-	At bridge, $1\frac{1}{2}$ miles South of Tavistock, 13th Conc. East Zorra Township	1,000,000	2,400,000
9-	At bridge, $\frac{1}{2}$ mile South of Tavistock, 13th Conc., E. Zorra Township	100,000	240,000
10-	Hickson at creek 50 yards above Borden Plant drain	10,000	24,000
11-	Hickson at creek 30 yards below Borden Plant drain	1,000,000	2,400,000
12-	Samples not reported		
13-	Samples not reported		
14-	German Union Cheese Factory, 20 yards above factory drain	1,000	2,400
15-	German Union Cheese Factory, 20 yards below factory drain	10,000,000	24,000,000
16-	Thames River junction of creeks from Hickson and Tavistock	1,000	2,400
17-	At creek, 2 miles South of Cassel (approx. 100 yds. below cheese factory outlet)	100	240
18-	At creek, near Cassel cheese fac- tory outlet	100,000	240,000
19-	Bright, 2 miles S.W. of Bright cheese factory	1,000,000	2,400,000
20-	Horner's Creek, 1 mile W. of Bright, Highway 69	1,000	2,400

<u>Sample No.</u>	<u>Place</u>	<u>Indicated No.</u>	<u>Calculated MPN</u>
21-	$\frac{1}{4}$ mile North of Plattsville E. Branch of Nith River	1,000	2,400
22-	$\frac{1}{2}$ mile S. of Plattsville E. Branch of Nith River	1,000	2,400
23-	Plattsville below industrial drain outlet	100,000	240,000
24-	Nith River (West Branch) $1\frac{1}{2}$ miles West of Plattsville	1,000	2,400
25-	Nith River (West Branch) 200 yds. before joining East Branch	1,000	2,400
26-	Nith River 25 yards below junction of East and West Branches	10,000	24,000
27-	Washington Creek, at West entrance to municipality	1,000	2,400
28-	Washington Creek, 300 yards South of Municipality	10,000	24,000
29-	Washington Creek, at 12th Conc., Blenheim	1,000	2,400
30-	Creek from New Dundee before joining Nith River	1,000	2,400
31-	Nith River, above junction of New Dundee Creek	10,000	24,000
32-	Nith River, near East Boundary of Oxford County	1,000	2,400
<u>Reynold's Creek</u>			
1-	Mt. Elgin above Municipal drain		790
2-	Mt. Elgin below Municipal drain		460
3-	2 miles South of Verschoyle		200
<u>Norwich (Otter Creek)</u>			
1-	At bridge on N. Court St.	1,000	2,400
2-	At bridge on Main St. above broom factory	1,000	2,400
3-	Below broom factory outfall	100,000	240,000
4-	At Pitcher St. Bridge	10,000	24,000
5-	At Stover St. Bridge	1,000	2,400
6-	Otter Creek, $\frac{1}{4}$ mile South East of Norwich	1,000,000	2,400,000

<u>Sample No.</u>	<u>Place</u>	<u>Indicated No.</u>	<u>Calculated MPN</u>
<u>Norwich (Otter Creek)</u>			
7-	Otter Creek, $\frac{1}{2}$ mile South East of Norwich	10,000	24,000
<u>Otterville (Otter Creek)</u>			
<del>8-</del>	Otter Creek at Municipal Park	1,000	2,400
9-	Otter Creek at dam	1,000	2,400
10-	Otter Creek at Highway 59	1,000	2,400
11-	Otter Creek $\frac{3}{4}$ mile South of Otterville	10,000	24,000
12-	Otter Creek $\frac{1}{4}$ mile South of Otterville	1,000	2,400
<u>Thames River</u>			
13-	Thames River, 50 yards above Red Star Cheese factory	1,000	2,400
14-	Thames River, 20 yards below Red Star Cheese factory	1,000	2,400
<u>Tillsonburg (Otter Creek)</u>			
15-	Otter Creek at railway bridge East entrance to Town	10,000,000	24,000,000
16-	Otter Creek at Sincove St. bridge	1,000	2,400
17-	Otter Creek at Van St. bridge	1,000	2,400
18-	Otter Creek above municipal sewage settling tank	1,000	2,400
19-	Otter Creek below municipal sewage settling tank	100,000	240,000
20-	Otter Creek below Borden plant outfall	100,000	240,000
21-	Creek entering Otter Creek, W. of municipal sewage tank outlet	1,000,000,000	2,400,000,000



## OXFORD COUNTY

STREAM POLLUTION SURVEY  
SCALE 1 INCH = 1/4 MILES

SEPTEMBER 1957

ONTARIO WATER RESOURCES COMMISSION  
PREPARED BY S. J.

CANALS AND POND NUMBER SHOWN IN THIS